CENTERS FOR DISEASE CONTROL

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Epidemiologic Notes and Reports

Preliminary Report: Epidemic Fatal Purpuric Fever Among Children — Brazil

From October 14, to December 15, 1984, an outbreak of an unusual illness occurred in a small town (population 20,000) in the state of São Paulo, Brazil. Ten children, aged 3 months to 8 years, developed acute onset of high fever associated with vomiting and abdominal pain. Within 12-48 hours after onset of fever, these children developed purpura, followed by vascular collapse and necrosis of peripheral tissues. All 10 children died.

In all cases, laboratory examinations demonstrated only nonspecific findings, and cerebrospinal fluid (CSF) examinations did not suggest meningitis. White blood cell counts, elevated initially, were depressed immediately before death; hematocrits were normal; and thrombocytopenia was present. Bacterial cultures were negative, although antibiotics had been administered before obtaining cultures in most, if not all, instances. Autopsy examination characteristically demonstrated cerebral edema without meningitis, adrenal hemorrhage, lymphocyte depletion in lymphoid tissue, early fatty changes in the liver, fibrin deposition in small blood vessels, and changes consistent with acute shock in other organs. No organisms were visualized on microscopic examination by Gram or Dieterle staining.

At the same time the outbreak was occurring, another group of children in the same town developed what may have been a milder form of the same illness consisting of high fever, vomiting, and abdominal pain without progression to purpura or shock. No other illnesses were occurring in the town at above background level; no cases of meningitis occurred during this period; and no increase in any illnesses among older children or adults was noted.

The parents of children who died were extensively interviewed. No evidence was uncovered to suggest a common toxic exposure or preceding vaccination and no secondary transmission of the illness occurred. One consistent finding was noted—in most instances, a self-limited purulent conjunctivitis had preceded the onset of other symptoms by 3-15 days. A case-control study confirmed that children who died or children with suspected disease were significantly more likely than control children to have had conjunctivitis during the time of the outbreak (18/20 cases and suspected cases, compared with 9/20 controls [$p = 0.006$]). A systematic survey of households with children 10 years of age or under documented that a small epidemic of purulent conjunctivitis, distinguishable from previous epidemics of viral hemorrhagic conjunctivitis, had occurred in the low income peripheral sections of the town during October and November. *Haemophilus aegyptius* was the most common organism isolated from conjunctival cultures taken from children with purulent conjunctivitis during this time. No cultures of conjunctivitis were obtained from children who developed severe illness; however, *H. aegyptius* was isolated from a nonaseptically obtained skin scraping of a petechia from one case-patient.

Purpuric Fever — Continued

In May 1984, another cluster of deaths among children occurred in a city in the neighboring state of Paraná. Although coexisting background meningococcal disease made recognition at the time difficult, retrospective evaluation of these cases revealed that the age distribution, symptoms, clinical presentation, history of preceding conjunctivitis, and laboratory findings were similar to the cases in Sao Paulo State.

Epidemic disease in two geographically distinct areas suggested the presence of more widespread illness. To identify additional cases of this illness, a case definition for sporadic disease was established:

Brazilian Purpuric Fever (BPF) [Febre Purpúrica do Brasil]

1. An acute illness in a child aged 3 months to 10 years characterized by:
   a. Fever 38.5 C (101.3 F) or higher.
   b. Abdominal pain and/or vomiting.
   c. Development of petechiae and/or purpura within 72 hours after onset of fever.
   d. No evidence of meningitis.
2. History of conjunctivitis within the 15 days preceding onset of fever.
3. At least one of the following two tests negative for *Neisseria meningitidis*:
   a. Blood cultures taken before antibiotic administration.
   b. Serum or urine antigen detection.*
4. In fatal cases, pathologic exam negative for microorganisms.
5. Other laboratory data, if obtained:
   a. Cerebrospinal fluid containing 100 or fewer leukocytes mm^3 and negative by culture or antigen detection for pathogenic bacteria.
   b. Blood cultures taken before antibiotic administration negative for known pathogenic bacteria.
   c. Serologic studies, if obtained, negative for known pathogens.

Using this definition, sporadic cases of BPF occurring at times other than the outbreak periods were identified in both towns and in five additional cities. A BPF task force, consisting of Brazilian laboratorians, clinicians, pathologists, and epidemiologists, as well as CDC investigators, has been created to further study the illness. High priority has been placed on collecting acute and convalescent sera, urines, autopsy tissues, and clinical material.

Reported by the Brazilian Purpuric Fever Task Force, São Paulo, Brazil.

Editorial Note: BPF, a serious illness affecting healthy young children, has not been previously recognized in Brazil. Epidemiologic and laboratory evaluations have not yet revealed an etiologic agent. Mortality has been approximately 70% for sporadic and epidemic cases identified to date. Transmission of illness from one child to another has not been observed. With clusters of cases, recognition of disease is not difficult; however, study of sporadic illness is hindered by the difficulty of differentiating cases of BPF from sporadic cases of meningococcemia, particularly in areas with poor laboratory support. Clinically, the illness is best categorized as purpura fulminans (*1*), a rare syndrome seen most commonly in children and characterized by purpura, fever, and hypotension. Purpura fulminans has been described in two forms: acute, resulting from overwhelming bacteremia, and delayed, most often occurring several days to weeks after a preceding viral or bacterial infection. There have been no reports of this second form of purpura fulminans occurring in epidemic form.

At present, the incidence of BPF and its geographic distribution are unknown. Additional laboratory and epidemiologic studies are being conducted by Brazilian health authorities and CDC. Questions about the syndrome or reports of similar illnesses should be directed to the Respiratory and Special Pathogens Epidemiology Branch, Division of Bacterial Diseases, CDC; telephone (404) 329-3687.

*If necessary, these samples can be stored for subsequent testing at a reference laboratory.

Purpuric Fever — Continued

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Perspectives in Disease Prevention and Health Promotion

Leading Work-Related Diseases and Injuries — United States

The National Institute for Occupational Safety and Health (NIOSH) has developed a suggested list of the leading work-related diseases and injuries (Table 1). The first four categories have been described previously (1-4); *a discussion of the fifth category, "Cardiovascular Diseases," appears below.*

CARDIOVASCULAR DISEASES

Cardiovascular diseases, including hypertensive disease (International Classification of Diseases 9th Revision [ICD] codes 401-405), ischemic heart disease (ICD codes 410-414), other forms of heart disease (ICD codes 420-429), and cerebrovascular disease (ICD codes 430-438), are responsible for more deaths in the United States each year than any other category of disease (*5*). In 1980, cardiovascular diseases claimed over 960,000 lives, with ischemic heart disease responsible for over 565,000 of these deaths (*6*). Although the rates of death from cardiovascular diseases have declined gradually over the last decade, coronary atherosclerosis and acute myocardial infarction remain the leading causes of death in the United States.

The role of occupation as a factor in cardiovascular disease is far from clear (*7*). Most investigators believe that personal risk factors, such as cigarette smoking, blood pressure, diet, personality, and heredity, are more important than environmental factors (*8*). Specific data are sparse on the role of occupational factors. Nevertheless, some occupational factors are clearly associated with heart diseases, and evidence on other factors is accumulating (*9*). Be-

Table 1. The 10 leading work-related diseases and injuries — United States, 1982*

1. Occupational lung diseases: asbestosis, byssinosis, silicosis, coal workers' pneumoconiosis, lung cancer, occupational asthma
2. Musculoskeletal injuries: disorders of the back, trunk, upper extremity, neck, lower extremity; traumatically induced Raynaud's phemonenon
3. Occupational cancers (other than lung): leukemia; mesothelioma; cancers of the bladder, nose, and liver
4. Severe occupational traumatic injuries: amputations, fractures, eye loss, lacerations, and traumatic deaths
5. Cardiovascular diseases: hypertension, coronary artery disease, acute myocardial infarction
6. Disorders of reproduction: infertility, spontaneous abortion, teratogenesis
7. Neurotoxic disorders: peripheral neuropathy, toxic encephalitis, psychoses, extreme personality changes (exposure-related)
8. Noise-induced loss of hearing
9. Dermatologic conditions: dermatoses, burns (scaldings), chemical burns, contusions (abrasions)
10. Psychologic disorders: neuroses, personality disorders, alcoholism, drug dependency

*The conditions listed under each category are to be viewed as *selected examples*, not comprehensive definitions of the category.

Leading Work-Related Diseases and Injuries — Continued

cause heart diseases are still so prevalent in the United States, identifying and preventing occupational factors that result in even a small increase in the relative risk of cardiovascular disease would involve large numbers of persons. Thus, preventing any occupational contribution to this problem would be an important public health measure.

In 1978, an ad hoc task force was formed by the American Heart Association to review the data regarding the environmental impact on cardiovascular disease (*8*). Its report, "The Impact of the Environment on Cardiovascular Disease," was published in 1981. The task force identified and reviewed six environmental factors that have potential impact on cardiovascular health: water hardness; trace elements; inhalant occupational exposures; carbon monoxide; noise and radiofrequency; and physical and psychosocial stress. The workplace is a specific source of potential exposure for all but the first.

Metals, Dusts, Trace Elements. The development of congestive heart failure that results from restrictive lung disease (cor pulmonale) has been observed in studies of occupational respiratory diseases, such as chronic beryllium disease and silicosis. Other metals, such as antimony, cobalt, and lead, have been implicated as possible causes of cardiovascular diseases.

Occupational Inhalants and Other Chemical Exposures. These include:

1. **Carbon monoxide**: Carbon monoxide decreases the oxygen-carrying capacity of hemoglobin and thus reduces the oxygen supply available to heart muscle and other tissues. In persons with preexisting coronary artery disease, occupational exposures to carbon monoxide may precipitate acute cardiovascular events, such as untoward changes in cardiac rhythm. In animal studies, life-threatening arrhythmias, such as ventricular tachycardia and ventricular fibrillation, have been observed in response to exposures to carbon monoxide that produced a carboxyhemoglobin concentration of 9% and above.

   In one study of workers, short-term exposure to carbon monoxide at levels within the current Occupational Safety and Health Administration permissible exposure limit (50 ppm) was associated with decreased exercise tolerance and electrocardiographic evidence of myocardial ischemia. In another study among Finnish foundry workers exposed to carbon monoxide, the overall prevalence of angina pectoris was increased; this was most pronounced among workers who also smoked. Among British steelworkers, investigators found end-of-shift carboxyhemoglobin saturations substantially higher among blast furnace workers than among steelworkers in other jobs. This was observed for both smoking and nonsmoking employees.
2. **Carbon disulfide**. Carbon disulfide, a widely used solvent, has been shown to increase the risk of cardiovascular disorders, including coronary artery disease and hypertension, in both epidemiologic and experimental studies. It has also been shown to pose a significant risk for coronary death (*10*). The atherogenic potential of carbon disulfide involves both cerebrovascular and cardiovascular systems.
3. **Halogenated hydrocarbons**. Acute exposures to many common industrial solvents (e.g., chloroform, trichloroethylene) and fluorocarbon aerosol propellants have precipitated sudden death probably due to cardiac arrhythmias in workers exposed at high levels. Other common aerosols or solvents may be arrhythmogenic at concentrations permitted by current occupational exposure standards. A recent study of pathologists exposed to monochlorodifluoromethane (a fluorocarbon aerosol propellant) in hospitals showed an increased incidence of "palpitations" at levels of exposure far below the recommended standard.
4. **Nitroglycerin and nitrates**. Workers exposed to nitroglycerin and nitrates during the manufacture of explosives experienced increased risk of cardiac chest pain, myocardial infarction, and sudden death, particularly after a period of time away from exposure. The mechanism is thought to be "rebound vasospasm" as a consequence of withdrawal from exposure.

Leading Work-Related Diseases and Injuries – Continued

Noise. Tens of millions of workers are exposed to high levels of sustained and/or intermittent noise in the workplace. A number of studies have demonstrated that single exposures to noise cause transient increases in blood pressure. Chronic exposure to occupational noise has also been associated with sustained increases in blood pressure, particularly in workers with noise-induced hearing loss (*11,12*). Increases in serum cholesterol and changes in circulating hormones have been observed in humans in association with noise. In studies of animals, abnormalities in platelet aggregation have been documented following exposure to noise.

Psychosocial Stress. Stress has long been thought to adversely affect the cardiovascular system (*13*). A relationship between psychologic factors and cardiovascular disease is supported by the correlation between "Type A personality" and such disorders. A 1976 assessment suggested that "work-overload," role conflicts, and thwarted career goals were related to evidence of cardiovascular disease. A prospective evaluation of health changes among air traffic controllers, published in 1978, showed an increased prevalence of hypertension among controllers, attributed by the authors to difficulties in coping with working conditions.

An updated analysis of the Framingham heart study in 1980 (*14,15*), indicated that rates of coronary heart disease were nearly twofold greater among women employed in clerical jobs than among housewives. Significant predictors of the risk of coronary heart disease included a "nonsupportive supervisor" and decreased job mobility. Occupation may also affect the risk of cardiovascular disease in a spouse. Men whose wives worked in white collar jobs were observed to experience heart disease at a rate three times greater than men whose wives worked in clerical or blue collar jobs or were housewives. Similarly, men appeared to have a higher risk of cardiovascular disease if they had well-educated, working wives who reported nonsupportive supervisors or few opportunities for job promotion. These and similar results suggest that adjustments to the conflicting demands of job and family may be important factors in the risk of cardiovascular disease.

Recent evaluations of data from a large random sample of the Swedish working male population (*16*), and from other surveys, also suggest that certain working conditions, such as limited autonomy and heavy workloads, are associated with clinical indicators of coronary heart disease.

Epidemiologic studies are clearly needed to define the significance of these and other occupational stress factors in the etiology of cardiovascular diseases. Such physical stresses as noise, vibration, and heat also merit investigation for possible interaction with the psychologic risk factors of cardiovascular disease.

Reported by Div of Surveillance, Hazard Evaluations, and Field Studies, National Institute for Occupational Safety and Health, CDC.

Editorial Note: Because cardiovascular diseases are so prevalent, they clearly affect large numbers of workers in the United States. A proportion of these diseases are caused or aggravated by risk factors in the work environment. NIOSH is currently collecting epidemiologic data to properly evaluate the role of the workplace in these diseases.

Since some occupational exposures clearly contribute to the morbidity and mortality attributable to cardiovascular diseases, further epidemiologic research is essential to define the extent of their occupational role and to define etiologic mechanisms. In addition, since cardiovascular diseases cause so much mortality in the United States, preventing even a small increase in relative risk due to occupational exposures would have major consequences to the public health. That mortality from cardiovascular disease has declined markedly in recent years indicates that these diseases are preventable.

The workplace is an important focus for efforts to prevent cardiovascular disease because: (1) it is the source of some preventable environmental exposures and psychosocial stresses that adversely affect cardiovascular health; (2) it offers unique opportunities for health promotion activities that encourage workers to improve their personal health behaviors (e.g., smoking

Leading Work-Related Diseases and Injuries — Continued

cessation, appropriate exercise, and sound nutrition) and; (3) it provides an advantageous setting for delivering preventive services, such as screening for hypertension.

*References**

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*Additional references are available on request from the National Institute for Occupational Safety and Health, CDC.

(Continued on page 227)

TABLE I. Summary—cases of specified notifiable diseases, United States

Disease	16th Week Ending			Cumulative, 16th Week Ending		
	Apr. 20, 1985	Apr. 21, 1984	Median 1980-1984	Apr. 20, 1985	Apr. 21, 1984	Median 1980-1984
Acquired Immunodeficiency Syndrome (AIDS)	158	88	N	2,041	1,095	N
Aseptic meningitis	41	63	63	1,066	1,228	1,228
Encephalitis: Primary (arthropod-borne & unspec.)	10	21	14	271	250*	250
Post-infectious	2	4	4	40	31	29
Gonorrhea: Civilian	15,279	15,630	17,485	239,292	248,229	283,524
Military	252	358	484	5,485	6,224	8,203
Hepatitis: Type A	445	423	423	6,458	6,463	7,169
Type B	463	493	412	7,535	7,539	6,248
Non A, Non B	88	73	N	1,600	1,086	N
Unspecified	114	115	166	1,594	1,436	2,607
Legionellosis	10	11	N	160	152	N
Leprosy	15	4	4	107	62	62
Malaria	15	26	23	199	206	231
Measles: Total*	94	128	88	803	878	878
Indigenous	79	116	N	600	773	N
Imported	15	12	N	203	105	N
Meningococcal infections: Total	52	72	81	935	1,104	1,104
Civilian	51	71	81	934	1,102	1,102
Military	1	1	-	1	2	5
Mumps	82	93	93	1,275	1,156	1,708
Pertussis	25	118	21	387	651	328
Rubella (German measles)	5	16	68	122	172	799
Syphilis (Primary & Secondary): Civilian	490	552	564	7,551	8,705	9,335
Military	3	6	6	56	102	115
Toxic Shock syndrome	11	16	N	110	144	N
Tuberculosis	476	432	569	5,857	6,159	7,396
Tularemia	-	-	2	24	19	31
Typhoid fever	5	10	6	77	99	114
Typhus fever, tick-borne (RMSF)	1	8	8	14	30	26
Rabies, animal	71	126	160	1,366	1,467	1,752

TABLE II. Notifiable diseases of low frequency, United States

	Cum 1985		Cum 1985
Anthrax	-	Plague	-
Botulism: Foodborne	1	Poliomyelitis: Total	1
Infant (Calif. 3)	13	Paralytic	1
Other	-	Psittacosis (Calif. 1)	42
Brucellosis (Md. 1, Okla. 2)	26	Rabies, human	-
Cholera	-	Tetanus (Upstate N.Y. 1, Mich. 1)	15
Congenital rubella syndrome	-	Trichinosis (Upstate N.Y. 1, Calif. 2, Alaska 2)	28
Diphtheria (Colo. 1)	1	Typhus fever, flea-borne (endemic, murine)	3
Leptospirosis	8		

*Twelve of the 94 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending April 20, 1985 and April 21, 1984 (16th Week)

Reporting Area	AIDS	Aseptic Menin-gitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionel-losis	Leprosy
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum 1985	1985	Cum 1985	Cum 1985	Cum 1985	Cum 1984	1985	1985	1985	1985	1985	Cum 1985
UNITED STATES	2,041	41	271	40	239,292	248,229	445	463	88	114	10	107
NEW ENGLAND	62	-	4	-	7,410	7,412	6	28	1	5	-	2
Maine	3	-	-	-	310	280	-	2	-	-	-	-
N.H.	-	-	2	-	155	192	-	-	-	-	-	-
Vt.	-	-	-	-	70	116	-	-	-	-	-	-
Mass.	39	-	2	-	2,690	2,965	4	16	-	4	-	2
R.I.	4	-	-	-	549	488	-	4	1	-	-	-
Conn.	16	-	-	-	3,636	3,371	2	6	-	1	-	-
MID ATLANTIC	864	10	43	-	33,710	33,990	26	57	15	3	-	10
Upstate N.Y.	117	5	15	-	4,791	5,034	10	23	1	1	-	-
N.Y. City	580	2	3	-	15,272	14,719	2	3	-	-	-	10
N.J.	106	2	11	-	6,720	5,390	6	4	11	-	-	-
Pa.	61	1	14	-	6,927	8,847	8	27	3	2	-	-
E.N. CENTRAL	100	8	66	10	34,096	33,938	12	42	10	6	8	2
Ohio	23	2	25	3	8,783	8,945	2	15	4	3	5	2
Ind.	4	-	12	1	3,182	3,537	1	3	3	2	-	-
Ill.	39	1	7	4	9,421	7,933	1	1	-	-	-	-
Mich.	21	5	18	-	10,039	9,675	8	23	3	1	3	-
Wis.	13	-	4	2	2,671	3,848	-	-	-	-	-	-
W.N. CENTRAL	19	1	25	3	12,291	11,727	14	16	3	-	-	-
Minn.	3	-	10	1	1,803	1,677	1	2	-	-	-	-
Iowa	3	1	9	-	1,320	1,351	2	3	-	-	-	-
Mo.	10	-	-	-	5,681	5,529	4	6	1	-	-	-
N. Dak.	-	-	-	1	86	127	-	-	-	-	-	-
S. Dak.	-	-	-	-	218	322	3	1	-	-	-	-
Nebr.	-	-	1	-	1,190	807	-	-	-	-	-	-
Kans.	3	-	5	1	1,993	1,914	4	4	2	-	-	-
S. ATLANTIC	223	10	28	13	51,480	63,243	22	73	12	6	1	2
Del.	6	-	1	-	1,136	1,048	-	-	-	-	-	-
Md.	34	1	9	1	7,957	7,609	1	11	-	-	-	-
D.C.	32	-	-	-	4,358	4,544	-	3	-	-	-	-
Va.	15	-	3	4	5,442	5,937	2	1	-	-	-	-
W. Va.	1	-	2	-	733	750	-	2	-	-	-	-
N.C.	15	3	10	-	9,567	10,251	3	13	2	1	1	1
S.C.	2	-	3	-	6,692	5,928	-	5	1	1	-	-
Ga.	48	-	-	-	-	12,406	5	12	2	-	-	-
Fla.	70	6	-	8	15,595	14,770	11	26	7	4	-	1
E.S. CENTRAL	14	2	9	3	20,754	21,148	19	37	-	4	-	-
Ky.	7	-	3	-	2,280	2,552	9	12	-	1	-	-
Tenn.	-	1	4	-	8,185	8,610	10	16	-	1	-	-
Ala.	6	-	2	3	6,528	6,766	-	3	-	2	-	-
Miss.	1	1	-	-	3,761	3,220	-	6	-	-	-	-
W.S. CENTRAL	167	1	26	-	33,922	34,128	51	25	3	18	-	11
Ark.	2	-	1	-	3,161	2,954	-	-	-	-	-	-
La.	24	-	1	-	7,380	7,559	3	7	-	-	-	1
Okla.	2	-	9	-	3,479	3,678	3	3	-	1	-	-
Tex.	139	1	15	-	19,902	19,937	45	15	3	17	-	10
MOUNTAIN	33	1	9	3	7,821	7,597	73	16	14	17	-	-
Mont.	-	-	-	-	232	353	11	-	-	-	-	-
Idaho	-	-	-	-	264	352	21	1	1	-	-	-
Wyo.	-	-	-	-	202	231	-	-	1	-	-	-
Colo.	12	-	3	-	2,361	2,215	7	2	3	9	-	-
N. Mex.	4	-	-	-	924	877	7	3	3	2	-	-
Ariz.	12	-	1	-	2,309	1,939	11	9	3	1	-	-
Utah	2	1	5	3	300	418	6	1	1	4	-	-
Nev.	3	-	-	-	1,229	1,212	10	-	2	1	-	-
PACIFIC	559	8	61	8	37,808	35,046	222	169	30	55	1	80
Wash.	30	1	3	-	2,553	2,536	20	15	3	4	1	12
Oreg.	10	-	-	-	1,952	2,024	31	10	4	-	-	2
Calif.	504	7	58	8	31,755	28,996	171	144	23	51	-	61
Alaska	2	-	-	-	945	882	-	-	-	-	-	-
Hawaii	13	-	-	-	603	608	-	-	-	-	-	5
Guam	-	U	-	-	23	89	U	U	U	U	U	-
P.R.	27	3	3	1	1,213	1,021	3	16	1	1	-	2
V.I.	1	U	-	-	130	131	U	U	U	U	U	-
Pac. Trust Terr.	-	U	-	-	-	-	U	U	U	U	U	-

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending April 20, 1985 and April 21, 1984 (16th Week)

Reporting Area	Malaria	Measles (Rubeola)					Meningococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum 1985	1985	Cum 1985	1985	Cum 1985	Cum 1984	Cum 1985	1985	Cum 1985	1985	Cum 1985	Cum 1984	1985	Cum 1985	Cum 1984
UNITED STATES	199	79	600	15	203	878	935	82	1,275	25	387	651	5	122	172
NEW ENGLAND	9	2	2	9	49	34	39	-	28	2	21	12	-	4	11
Maine	-	-	-	-	-	-	1	-	3	-	2	-	-	-	1
N.H.	-	-	-	-	-	10	3	-	5	-	11	3	-	1	-
Vt.	-	-	-	-	-	-	6	-	2	-	2	5	-	-	-
Mass.	6	2	2	8†	48	22	8	-	15	-	3	3	-	3	10
R.I.	1	-	-	-	-	-	6	-	2	-	1	1	-	-	-
Conn.	2	-	-	1†	1	2	15	-	1	2	2	-	-	-	-
MID ATLANTIC	37	6	49	1	11	27	162	13	137	1	44	35	2	31	7
Upstate N.Y.	14	2	27	1§	2	5	74	2	84	1	20	19	1	8	5
N.Y. City	10	-	16	-	5	15	19	-	12	-	7	1	-	7	1
N.J.	4	-	2	-	4	3	26	3	14	-	1	1	1	4	1
Pa.	9	4	4	-	-	4	43	8	27	-	16	14	-	12	-
E.N. CENTRAL	9	1	139	2	94	371	166	12	558	-	51	204	-	7	36
Ohio	2	-	-	2†§	13	2	57	6	170	-	13	34	-	-	2
Ind.	1	-	-	-	1	3	26	1	21	-	11	136	-	-	1
Ill.	-	1	74	-	66	111	33	3	96	-	9	15	-	2	21
Mich.	6	-	35	-	14	248	35	2	223	-	7	10	-	5	5
Wis.	-	-	30	-	-	7	15	-	48	-	11	9	-	-	7
W.N. CENTRAL	4	-	1	1	4	1	41	2	41	-	37	65	-	7	17
Minn.	1	-	-	1†	2	1	10	-	1	-	11	3	-	-	1
Iowa	-	-	-	-	-	-	7	-	6	-	2	3	-	-	-
Mo.	1	-	-	-	2	-	19	-	5	-	8	12	-	-	-
N. Dak.	1	-	-	-	-	-	-	1	1	-	6	-	-	-	3
S. Dak.	1	-	-	-	-	-	1	-	-	-	-	1	-	-	-
Nebr.	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Kans.	-	-	1	-	-	-	4	1	28	-	10	44	-	7	13
S. ATLANTIC	23	3	101	1	4	7	180	17	102	7	90	55	-	11	15
Del.	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-
Md.	5	1	4	1§	2	-	22	1	12	3	22	3	-	1	-
D.C.	3	-	-	-	1	-	5	-	-	-	-	-	-	-	-
Va.	5	-	11	-	1	2	26	3	15	1	3	7	-	-	-
W. Va.	1	-	2	-	-	-	4	2	32	-	-	6	-	-	-
N.C.	2	-	-	-	-	-	26	-	7	-	7	17	-	-	-
S.C.	-	-	-	-	-	-	16	-	5	-	-	2	-	2	-
Ga.	1	-	8	-	-	-	27	8	12	-	36	5	-	4	2
Fla.	6	2	76	-	-	5	51	3	18	3	22	15	-	4	13
E.S. CENTRAL	3	-	-	-	-	3	43	1	7	-	4	3	-	1	5
Ky.	1	-	-	-	-	1	2	-	1	-	1	1	-	1	1
Tenn.	-	-	-	-	-	2	17	1	5	-	1	2	-	-	-
Ala.	2	-	-	-	-	-	12	-	-	-	2	-	-	-	1
Miss.	-	-	-	-	-	-	12	-	1	-	-	-	-	-	3
W.S. CENTRAL	9	9	32	-	-	137	81	14	131	10	29	133	-	13	5
Ark.	-	-	-	-	-	-	8	-	3	-	7	9	-	1	2
La.	-	-	1	-	-	-	13	-	2	1	2	3	-	-	-
Okla.	-	-	-	-	-	4	14	N	N	9	20	112	-	-	-
Tex.	9	9	31	-	-	133	46	14	126	-	-	9	-	12	3
MOUNTAIN	9	53	207	-	21	108	49	8	104	-	21	52	-	3	6
Mont.	-	1	106	-	17	-	3	-	4	-	3	16	-	-	-
Idaho	-	-	-	-	1	-	-	-	4	-	-	1	-	1	1
Wyo.	-	-	-	-	-	-	3	1	2	-	-	3	-	-	-
Colo.	3	-	-	-	3	-	14	-	11	-	8	17	-	-	-
N. Mex.	4	-	-	-	-	83	6	N	N	-	3	5	-	1	-
Ariz.	1	52	101	-	-	-	15	1	48	-	3	7	-	1	-
Utah	-	-	-	-	-	25	6	-	2	-	4	1	-	-	5
Nev.	1	-	-	-	-	-	2	6	33	-	-	2	-	-	-
PACIFIC	96	5	69	1	20	190	174	15	167	5	90	92	3	45	70
Wash.	9	-	1	-	-	39	32	2	11	1	13	8	-	-	1
Oreg.	4	-	2	-	-	-	19	N	N	-	16	7	-	2	-
Calif.	69	5	63	1†	16	149	119	12	145	4	57	27	-	32	67
Alaska	1	-	-	-	-	-	4	-	2	-	1	-	-	-	-
Hawaii	13	-	3	-	4	2	-	1	9	-	3	50	3	11	2
Guam	-	U	10	U	-	83	-	U	1	U	-	-	U	1	1
P.R.	-	-	40	-	-	-	6	-	51	-	1	-	1	5	2
V.I.	-	U	4	U	5	-	-	U	3	U	-	-	U	-	-
Pac. Trust Terr.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending April 20, 1985 and April 21, 1984 (16th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum 1985	Cum 1984	1985	Cum 1985	Cum 1984	Cum 1985	Cum 1985	Cum 1985	Cum 1985
UNITED STATES	7,551	8,705	11	5,857	6,159	24	77	14+1	1,366
NEW ENGLAND	166	184	1	199	172	-	5	-	-
Maine	5	1	-	16	9	-	-	-	-
N.H.	-	2	-	-	12	-	-	-	-
Vt.	-	1	-	3	2	-	-	-	-
Mass.	93	114	1	125	91	-	4	-	-
R.I.	6	8	-	16	17	-	-	-	-
Conn.	62	58	-	39	41	-	1	-	-
MID ATLANTIC	1,015	1,198	-	1,117	1,136	1	12	-	121
Upstate N.Y.	73	99	-	173	187	-	6	-	27
N.Y. City	643	716	-	595	472	1	2	-	-
N.J.	219	217	-	101	219	-	3	-	2
Pa.	80	166	-	248	258	-	1	-	92
E.N. CENTRAL	351	390	4	749	830	-	8	-	26
Ohio	39	84	1	132	172	-	2	-	4
Ind.	31	46	-	85	88	-	3	-	4
Ill.	178	134	-	329	345	-	1	-	5
Mich.	85	97	3	163	183	-	1	-	-
Wis.	18	29	-	40	42	-	1	-	13
W.N. CENTRAL	78	139	1	158	160	7	2	-	212
Minn.	20	30	-	28	25	1	2	-	31
Iowa	12	10	-	26	26	-	-	-	55
Mo.	30	80	-	71	73	5	-	-	15
N. Dak.	-	-	-	2	5	-	-	-	23
S. Dak.	4	-	-	7	5	-	-	-	59
Nebr.	3	5	-	8	9	1	-	-	11
Kans.	9	14	1	16	17	-	-	-	18
S. ATLANTIC	1,882	2,680	-	1,189	1,327	5	9	8	412
Del.	14	8	-	8	16	1	-	-	-
Md.	129	172	-	107	140	-	2	-	216
D.C.	102	94	-	54	41	-	-	-	-
Va.	105	129	-	95	119	-	1	-	60
W. Va.	4	8	-	27	53	-	-	-	3
N.C.	224	288	-	149	216	4	1	6	-
S.C.	245	251	-	143	145	-	-	1	19
Ga.	-	455	-	168	190	-	-	-	60
Fla.	1,059	1,275	-	438	407	-	5	1	54
E.S. CENTRAL	693	527	-	495	570	2	2	4+1	74
Ky.	26	27	-	82	128	-	-	-	12
Tenn.	193	133	-	152	175	2	-	1	18
Ala.	226	186	-	175	192	-	2	3 1	44
Miss.	248	181	-	86	75	-	-	-	-
W.S. CENTRAL	1,919	2,056	-	610	638	2	4	2	264
Ark.	90	71	-	55	63	1	-	-	45
La.	329	380	-	86	74	-	-	-	4
Okla.	48	63	-	72	63	1	-	2	37
Tex.	1,452	1,542	-	397	438	-	4	-	178
MOUNTAIN	241	205	1	145	138	5	4	-	104
Mont.	1	-	-	19	8	1	-	-	53
Idaho	2	9	-	3	8	-	-	-	-
Wyo.	4	3	-	3	-	-	-	-	3
Colo.	58	45	1	18	11	-	3	-	-
N. Mex.	27	25	-	27	31	2	1	-	1
Ariz.	134	85	-	64	60	-	-	-	47
Utah	3	7	-	5	10	2	-	-	-
Nev.	12	31	-	6	10	-	-	-	-
PACIFIC	1,206	1,326	4	1,195	1,188	2	31	-	153
Wash.	35	46	-	54	49	-	-	-	1
Oreg.	30	39	-	40	46	1	-	-	-
Calif.	1,115	1,214	4	999	1,010	1	30	-	152
Alaska	1	1	-	45	20	-	-	-	-
Hawaii	25	26	-	57	63	-	1	-	-
Guam	2	-	U	5	15	-	-	-	-
P.R.	272	266	-	90	114	-	1	-	9
V.I.	1	6	U	1	3	-	-	-	-
Pac. Trust Terr.	-	-	U	-	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending April 20, 1985 (16th Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	726	515	129	47	14	21	44
Boston, Mass.	190	109	41	23	6	11	14
Bridgeport, Conn.	43	33	6	2	1	1	1
Cambridge, Mass.	31	25	5	-	-	1	3
Fall River, Mass.	24	14	6	4	-	-	-
Hartford, Conn.	78	56	16	5	1	-	1
Lowell, Mass.	23	13	8	1	1	-	2
Lynn, Mass.	19	16	2	1	-	-	2
New Bedford, Mass.	33	29	3	1	-	-	2
New Haven, Conn.	65	49	9	3	-	4	2
Providence, R.I.	83	64	9	3	3	4	9
Somerville, Mass.	4	4	-	-	-	-	1
Springfield, Mass.	49	35	12	2	-	-	3
Waterbury, Conn.	35	30	4	-	1	-	1
Worcester, Mass.	49	38	8	2	1	-	3
MID. ATLANTIC	2,954	1,973	642	206	61	72	155
Albany, N.Y.	64	46	13	4	-	1	1
Allentown, Pa.	28	15	11	1	1	-	-
Buffalo, N.Y.	126	69	40	10	2	5	7
Camden, N.J.	48	31	12	3	2	-	2
Elizabeth, N.J.	26	17	5	3	-	1	5
Erie, Pa.†	41	36	3	-	-	2	2
Jersey City, N.J.	50	35	10	3	1	1	-
N.Y. City, N.Y.	1,414	932	314	112	26	30	68
Newark, N.J.	57	32	15	3	3	4	4
Paterson, N.J.	20	12	4	3	-	1	-
Philadelphia, Pa.	598	389	131	41	19	18	40
Pittsburgh, Pa.†	92	62	21	6	-	3	3
Reading, Pa.	34	27	5	2	-	-	4
Rochester, N.Y.	125	104	15	1	2	3	8
Schenectady, N.Y.	32	25	6	-	1	-	2
Scranton, Pa.†	22	13	7	2	-	-	5
Syracuse, N.Y.	96	66	19	5	3	3	1
Trenton, N.J.	28	22	3	3	-	-	-
Utica, N.Y.	26	19	4	2	1	-	2
Yonkers, N.Y.	27	21	4	2	-	-	1
E.N. CENTRAL	2,231	1,567	389	118	70	86	101
Akron, Ohio	65	42	14	4	3	2	6
Canton, Ohio	22	14	5	1	1	1	6
Chicago, Ill. §	553	462	11	26	16	37	16
Cincinnati, Ohio	146	92	39	6	3	6	15
Cleveland, Ohio	135	83	37	8	4	3	-
Columbus, Ohio	128	77	38	5	7	1	5
Dayton, Ohio	112	81	24	2	1	4	2
Detroit, Mich.	283	179	52	30	11	11	6
Evansville, Ind.	43	32	9	2	-	-	3
Fort Wayne, Ind.	55	41	10	3	-	1	2
Gary, Ind.	12	5	4	2	1	-	-
Grand Rapids, Mich.	49	35	10	-	2	2	3
Indianapolis, Ind.	158	93	37	9	10	9	2
Madison, Wis.	23	13	4	4	1	1	2
Milwaukee, Wis.	118	80	30	5	2	1	5
Peoria, Ill.	48	30	13	4	1	-	5
Rockford, Ill.	44	20	13	6	3	2	5
South Bend, Ind.	52	41	8	-	1	2	4
Toledo, Ohio	122	97	21	1	1	2	10
Youngstown, Ohio	63	50	10	-	2	1	4
W.N. CENTRAL	657	454	135	35	17	16	34
Des Moines, Iowa	54	40	10	1	2	1	4
Duluth, Minn.	23	17	4	1	1	-	1
Kansas City, Kans.	41	26	11	2	1	1	1
Kansas City, Mo.	127	72	38	11	2	4	7
Lincoln, Nebr.	35	29	4	1	1	-	-
Minneapolis, Minn.	79	54	15	5	3	2	2
Omaha, Nebr.	75	52	15	5	1	2	12
St. Louis, Mo.	124	95	16	5	4	4	1
St. Paul, Minn.	67	46	17	2	1	1	2
Wichita, Kans.	32	23	5	2	1	1	4

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,201	766	264	88	32	48	50
Atlanta, Ga.	154	103	30	15	6	-	3
Baltimore, Md.	191	118	46	16	4	7	3
Charlotte, N.C.	80	41	25	8	1	5	6
Jacksonville, Fla.	111	79	20	3	4	4	4
Miami, Fla.	97	63	21	8	2	3	1
Norfolk, Va.	61	37	11	5	3	5	1
Richmond, Va.	67	42	15	6	1	3	1
Savannah, Ga.	43	30	5	5	2	1	9
St. Petersburg, Fla.	94	73	15	3	2	1	7
Tampa, Fla.	75	51	14	3	3	2	5
Washington, D.C.	201	111	54	16	3	17	9
Wilmington, Del.	27	18	8	-	1	-	1
E.S. CENTRAL	843	528	220	54	20	21	37
Birmingham, Ala.	118	69	23	14	4	8	4
Chattanooga, Tenn.	55	38	12	2	2	1	1
Knoxville, Tenn.	77	49	20	4	2	2	2
Louisville, Ky.	135	93	31	7	2	2	8
Memphis, Tenn.	180	108	50	12	6	4	10
Mobile, Ala.	67	46	16	3	2	-	4
Montgomery, Ala.	65	41	17	4	1	2	4
Nashville, Tenn.	146	84	51	8	1	2	4
W.S. CENTRAL	1,439	851	324	155	51	57	64
Austin, Tex.	47	28	12	3	4	-	4
Baton Rouge, La.	71	37	23	6	2	3	4
Corpus Christi, Tex.	47	30	9	6	1	1	-
Dallas, Tex.	201	123	39	23	7	9	11
El Paso, Tex.	73	36	19	12	3	3	2
Fort Worth, Tex.	102	62	20	10	3	7	5
Houston, Tex.	440	240	100	62	19	19	14
Little Rock, Ark.	48	36	10	1	-	1	4
New Orleans, La.	93	52	24	9	6	2	1
San Antonio, Tex.	177	112	35	19	6	5	13
Shreveport, La.	47	32	13	2	-	-	1
Tulsa, Okla.	93	63	20	2	-	7	5
MOUNTAIN	642	377	149	40	36	40	37
Albuquerque, N.Mex.	74	38	18	4	9	5	4
Colo. Springs, Colo.	42	24	9	4	4	1	5
Denver, Colo.	117	63	27	11	2	14	5
Las Vegas, Nev.	90	52	31	4	3	-	5
Ogden, Utah	25	18	5	1	-	1	1
Phoenix, Ariz.	119	64	30	7	9	9	4
Pueblo, Colo.	20	15	4	1	-	-	1
Salt Lake City, Utah	51	32	7	3	4	5	3
Tucson, Ariz.	104	71	18	5	5	5	9
PACIFIC	1,751	1,117	389	132	61	52	105
Berkeley, Calif.	19	8	7	4	-	-	-
Fresno, Calif.	81	49	16	7	5	4	7
Glendale, Calif.	14	13	1	-	-	-	1
Honolulu, Hawaii	63	41	11	6	5	-	2
Long Beach, Calif.	95	60	20	5	6	4	4
Los Angeles, Calif.	245	157	54	21	10	3	9
Oakland, Calif.	81	52	17	4	4	4	5
Pasadena, Calif.	40	34	5	-	1	-	2
Portland, Oreg.	119	81	26	3	2	7	4
Sacramento, Calif.	141	103	25	9	3	1	15
San Diego, Calif.	156	97	32	18	3	6	17
San Francisco, Calif.	185	115	53	11	3	3	6
San Jose, Calif.	207	121	51	18	11	6	13
Seattle, Wash.	161	94	40	17	6	4	12
Spokane, Wash.	62	41	13	3	1	4	5
Tacoma, Wash.	82	51	18	6	1	6	3
TOTAL	12,444††	8,148	2,641	875	362	413	627

* Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

** Pneumonia and influenza

† Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

†† Total includes unknown ages.

§ Data not available. Figures are estimates based on average of past 4 weeks.

Leading Work-Related Diseases and Injuries — Continued

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Epidemiologic Notes and Reports

Disseminated *Mycobacterium bovis* Infection from BCG Vaccination of a Patient with Acquired Immunodeficiency Syndrome

In December 1982, Kaposi's sarcoma and acquired immunodeficiency syndrome (AIDS) were diagnosed in a 29-year-old white homosexual man. A trial of vinblastine sulfate failed to decrease the progression of his skin lesions. In February 1984, when seen in a clinic in Tijuana, Mexico, he was given a BCG vaccination. The expected local lesion from the BCG vaccination healed normally within the next few weeks. In June, he developed chills and fever to 39.4 C (103 F), weakness, fatigue, anorexia, and a mild headache. In July, the site of BCG vaccination on his left arm ulcerated, draining a small amount of pus and blood. A previously enlarged lymph node in the left axilla increased substantially in size and became very tender. Because of the possibility of disseminated BCG infection, treatment was begun with INH 300 mg/day, ethambutol 25 mg/kg/day, and pyridoxine. He rapidly became afebrile and regained his feeling of well-being. The ulcer healed slowly, and the enlarged lymph node decreased in size and tenderness. Two blood cultures taken June 28 and a culture of the ulcerating lesion taken July 16 grew *Mycobacterium bovis*, BCG strain. A blood culture taken July 23, just before therapy, grew *M. fortuitum*.

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Editorial Note: BCG vaccine contains live mycobacteria derived from a strain of *M. bovis* attenuated through years of serial passage in culture by Calmette and Guerin at the Pasteur Institute, Lille, France. Although BCG has been widely used throughout the world, its use in the United States is limited to those uncommon situations in which uninfected persons are repeatedly exposed to infectious tuberculosis, and other means of preventing infection cannot be applied (*1*). BCG has also been used to stimulate the immune system of patients with various cancers, especially malignant melanoma, with the objective of causing regression of the tumors (*2*). As with any vaccine containing live organisms, however, it is contraindicated in persons with severely impaired immune responses, including those with AIDS, because disseminated infection with the organism contained in the vaccine may result.

M. bovis and *M. tuberculosis* (the *M. tuberculosis* complex) are pathogenic for man and are

Disseminated Mycobacterium bovis *Infection — Continued*

distinct from the "atypical" mycobacteria that tend to be opportunistic. Infection with *M. bovis* or *M. tuberculosis*, even if disseminated, is generally not considered opportunistic and is, therefore, not used as a marker for AIDS in CDC's surveillance definition of AIDS (*3*). The BCG strain of *M. bovis*, however, being attenuated and not usually a cause of disease, may be considered an opportunist.

Of the 9,760 AIDS patients in the United States reported to CDC as of April 24, 1985, 2.7% were reported to have tuberculosis. Disseminated atypical mycobacterial infection, used as a marker for AIDS, was reported in 3.7%. Another 0.9% were reported to have disseminated infection with an undetermined species of mycobacteria. The true cumulative incidence of mycobacterial infections in AIDS patients is undoubtedly higher. The opportunistic infections reported to CDC's AIDS surveillance program are largely limited to those present at the time AIDS is diagnosed. Disseminated mycobacterial infections are not common among the initial opportunistic infections in AIDS patients, but in one series of 71 AIDS patients, 24 (34%) reportedly developed infection with *M. avium* complex organisms at some time during their illness (*4*). The great majority (94%) of the atypical mycobacterial infections reported to the AIDS surveillance program have been due to *M. avium* complex; 4% were due to *M. kansasii*; and 2%, to other species. Besides the patient reported here, only one other AIDS patient had disseminated *M. fortuitum* reported; the *M. fortuitum* cannot be explained by the BCG vaccine and may represent a contaminated culture rather than a true infection.

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Rubella in Colleges — United States, 1983-1984

In 1983 and 1984, six rubella outbreaks in universities and colleges in four states were reported to CDC's Division of Immunization, Center for Prevention Services (Table 2). A total of 125 rubella cases were reported, 124 among students and one in a faculty member. Attack rates varied from 0.2 per 1,000 to 5.4/1,000 among students. Ninety-three (74.4%) of those persons had inadequate evidence of immunity (*1*).* No pregnant students or other pregnant contacts were identified. No uniform case definition was used to identify suspected cases in any of these outbreaks. However, most illnesses were characterized by one or more of the following: maculopapular rash, lymphadenopathy (cervical, postauricular, or occipital), low-grade fever, coryza, conjunctivitis, sore throat, and/or arthralgia. Fifty-two (41.6%) cases were serologically confirmed as rubella by a positive rubella-specific IgM titer or a fourfold or greater rise in hemagglutination-inhibition (HI) antibody titer. Although three of the colleges had rubella immunization requirements for school entry, there was little or no enforcement of these requirements (Table 2).

In one college, the index patient was a student from South America who was incubating disease on arrival to this country. Since all foreign students attended special English language courses, subsequent cases were clustered among other international students. Cases in the other colleges clustered among particular dormitories, fraternities, and sororities where fre-

*The Immunization Practices Advisory Committee considers persons to be immune to rubella if they: (1) have a dated record of rubella vaccination on or after the first birthday or (2) have a detectable level of rubella antibody on any standard test. History of rubella disease, even if verified by a physician, is not acceptable as evidence of immunity.

Rubella — Continued

quent contact occurred.

As part of outbreak control measures, all the colleges issued notifications to students, faculty, and other employees urging that they provide proof of rubella immunity or be vaccinated with a rubella-containing vaccine. In some schools, outbreak-control measures also included: (1) reviewing student health records for immunization status; (2) providing free rubella vaccine at student health or special vaccination centers for susceptible persons and persons of unknown immune status; and (3) requesting pregnant women of susceptible or unknown immune status to avoid the campus and to contact a physician in the event of rash illness or exposure. Mandatory immunization programs or exclusion from the campus of susceptible or infected persons were not attempted in any of these outbreaks. Free vaccine, either measles-mumps-rubella (MMR) or measles-rubella (MR) vaccine, was provided by student health and local health department personnel at the student health service clinics in five schools. Acceptance of vaccination was poor, ranging from less than 50 students in one school (enrollment 37,000) to 1,100 students in another (enrollment 17,020) (Table 2). Overall, the 1,922 students vaccinated represented 2.5% of the total enrollment. If it were assumed that 7,546 (10.0%) of the 75,468 enrolled at these schools were susceptible (*2-4*) and that all 1,922 persons receiving vaccination were actually susceptible (Table 2), then the campus vaccination control programs would have reached 1,922 (25.5%) of 7,546 of those considered to be at risk for acquiring rubella. In most instances, the true number of students with records of either rubella immunization or serologic evidence of rubella immunity was unknown.

In two colleges—both of which had rubella immunity requirements—selective reviews of student health records were undertaken in an effort to estimate the number of potentially susceptible students. In one, 719 (71.3%) of 1,008 "day" students lacked acceptable evidence of immunity; in the other, 400 (15.1%) of 2,648 students lacked acceptable evidence of immunity. Of the 1,119 students considered susceptible in the two schools, 372 (33.2%) received MR or MMR vaccine as part of control efforts. The remainder were notified that they would not be registered in the next semester unless they produced records proving rubella immunity. Officials in the other schools had to base control measures on students' and parents' recollections of vaccine status.

TABLE 2. Reported rubella outbreaks in colleges and universities — United States, 1983-1984

Year	State	College	Enrollment	No. cases	Attack rate*	Proof of rubella immunity required	No. vaccinated in control program
1983	N.Y.	A	17,020	71	4.2	No	1,100
	Penn.	B	2,200	6	2.7	Yes†	271
	Calif.	C	14,000	23	1.6	No	400
1984	N.Y.	D	2,600	14§	5.4	No	N/A
	Mass.	E	37,000	6	0.2	Yes†	< 50
	Mass.	F	2,648	4	1.5	Yes†	101
Total	**4**	**6**	**75,468**	**124**	**1.7**	**3 Yes, 3 No**	**1,922**

*Cases per 1,000 persons.
†Requirements not enforced.
§Does not include one faculty member.

Rubella — Continued

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Editorial Note: The 1984 provisional total of 746 reported rubella cases in the United States is a new record low for rubella and represents a 23.1% decline from the 1983 total of 970 cases. In addition, based on the National Congenital Rubella Syndrome Register (NCRSR), only two infants with confirmed and compatible cases of congenital rubella syndrome (CRS) were reported to have been born in 1984, compared with six in 1983. Although these CRS statistics are provisional, they reflect the expected continuous decline in reported rubella and CRS cases that has occurred as the result of rubella vaccination. Although both rubella and CRS cases are underreported, these observed declines probably represent accurate trends in disease incidence, since the degree of underreporting is not expected to have changed appreciably over time.

Rubella outbreaks in the university setting illustrate the potential for outbreaks wherever large numbers of young adults congregate, since 5%-20% of adolescents and young adults remain susceptible to rubella and/or measles (*2-5*). Colleges and universities have become a primary focus for rubella and measles activity (*6-9*), with disease being introduced both from domestic sources and by foreign importation (*7,8*). For example, in 1983, 38.1% of all reported measles cases were college-associated; 19.8% occurred on college campuses. No comparable statistics for rubella in colleges are available. Undoubtedly, many college outbreaks went unrecognized and unreported because many cases of rubella are mild or subclinical. For the same reason, the number of rubella cases in the six reported outbreaks was also probably underestimated. Unless there is a sustained awareness among college health personnel that college-aged populations represent a significant pool of susceptibles to both rubella and measles, early recognition and rapid investigation of reported suspected cases may be seriously delayed. Most schools lack the immunization records to accurately identify susceptibles if an outbreak were to occur. Furthermore, reviewing records and implementing control programs during an outbreak are costly, disruptive, and not often effective. Voluntary programs, like those used in these outbreaks, have generally resulted in poor participation rates and vaccination of many individuals probably already immune. Mandatory control programs will increase compliance but have been rarely instituted to date.

Besides being costly and disruptive to campus life, outbreaks of rubella and measles pose special health risks to this childbearing-aged population, which would likely have higher morbidity rates from these diseases than children (*1,8*). No infected pregnant women were identified in these outbreaks. Pregnant women were involved in rubella outbreaks on university campuses in Washington and California in 1981; some of these women elected to terminate their pregnancies (*9*). The anxiety and disruption of classes associated with the warnings to and exclusion of pregnant women would have been unnecessary if these women had previously had adequate documentation of immunity with rubella vaccine. In spite of this recognized threat, most colleges lack immunization requirements. A 1984 survey assessed measles and rubella requirements among institutions of higher education in the United States. Preliminary findings suggested that as few as 16% of an estimated 3,600 colleges in the U.S. have requirements for measles and/or rubella immunity as a condition of attendance. No information on actual enforcement of these requirements was obtained.

While many serious health issues—ranging from alcohol and drug abuse to sexually transmitted venereal diseases and suicide—face college health officials, outbreaks of rubella and

Rubella — Continued

measles are problems with an available solution. The only way to prevent introduction of rubella on the campus is to have immune students, faculty, and employees. To support this goal, the American College Health Association and the Immunization Practices Advisory Committee strongly urge educational institutions to consider requiring proof of immunity against these diseases as a condition of registration or employment (*1*). Both male and female students and staff should be included in any such requirement. Such a requirement minimizes the likelihood of rubella or measles being introduced onto the campus and places the principal responsibility for assuring adequate vaccination status on the student.

Rhode Island and the District of Columbia have had longstanding college entrance requirements. Rhode Island has required rubella immunization for college women since 1980 and measles and rubella immunization for both men and women since January 1985. In Washington, D.C., under the "Immunization of School Children Act of 1979," all persons under 26 years of age are required to have completed diphtheria-tetanus, MMR, and polio immunizations for school entry. Colleges have taken the lead in enacting immunization requirements in Colorado and Mississippi. In Colorado, at least 10 colleges and universities have adopted measles and rubella requirements, and in Mississippi, the Board of Trustees of State Institutions of Higher Learning adopted a requirement for measles and rubella immunity for students registering at 4-year state-supported institutions as of fall 1984. Other states and universities are considering immunization requirements. In Massachusetts, a bill to be considered by the legislature would require proof of immunity to measles, mumps, rubella, tetanus, and diphtheria for all persons under 30 years of age entering as full-time freshmen.

The rubella vaccination policy in the United States has had a dramatic effect on the occurrence of rubella and CRS. Both diseases are now at record low levels, and an initiative to hasten the elimination of rubella has begun (*10*). Rubella should disappear from this country in 10-30 years merely by maintaining the current approach to controlling rubella. Increased efforts aimed at vaccinating more postpubertal individuals can shorten that time. Colleges can aid in the overall rubella elimination effort and protect their students and staff if rubella requirements are incorporated into student health policy.

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Reinstatement of Regular Diphtheria-Tetanus-Pertussis Vaccine Schedule

The status of diphtheria-tetanus-pertussis (DTP) vaccine availability in the United States and interim recommendations of the U.S. Public Health Service Interagency Group to Monitor

DTP Vaccine — Continued

Vaccine Development, Production, and Usage were recently reported (*1*). This statement recommended postponement of administration of the DTP vaccine doses usually given at ages 18 months and 4-6 years (fourth and fifth doses) until greater supplies are available.

Since November 1984, Lederle Laboratories has been distributing its own DTP vaccine, as well as that manufactured by Wyeth Laboratories. By following the recommendation of the Interagency Group, the quantities distributed have been sufficient to reduce the threat of critical shortages. On April 25, Connaught Laboratories announced its resumption of full-scale distribution of DTP vaccine and the availability of 2.2 million doses for immediate shipment. Connaught Laboratories will continue to produce vaccine at a level that will help meet U.S. needs.

Projected production schedules for the manufacturers indicate that supplies of DTP vaccine should be adequate to provide the normally recommended fourth and fifth doses of DTP and to provide the needed catch-up doses for children who have had them deferred.

In view of these developments, after consultation with members of the Immunization Practices Advisory Committee and Committee on Infectious Diseases of the American Academy of Pediatrics, the Interagency Group now feels that the interim recommendations no longer apply. Immunization providers should resume administration of the complete DTP schedule and implement recall procedures for children under 7 years of age whose fourth (18 month) and fifth (4-6 years) doses were deferred. It is especially important to make every effort to provide DTP vaccine doses to such children scheduled to enter kindergarten or first grade in the fall.

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Reported Measles Cases — United States, Past 4 Weeks

The following states have reported measles during the past 4 weeks: Arizona, California, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, New Jersey, upstate New York, Oregon, Texas, Virginia, West Virginia, and Wisconsin; New York City has also reported measles.

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